

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech. (Mechanical Engg.) (Sem.-6)**  
**INTERNAL COMBUSTION ENGINE**

Subject Code : BTME609-18

M.Code : 79654

Date of Examination : 12-07-22

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

**1. Write briefly :**

- a) What are the limitations of Carnot Engine?
- b) Define Compression ratio and Mean effective pressure.
- c) What is Air Standard efficiency?
- d) What was the need to switch over to Electronic fuel injection from Carburetor fuel supply systems?
- e) Differentiate between Actual and Fuel-Air cycle.
- f) Define Volumetric efficiency and need for Supercharging.
- g) What is ignition timing, how it is controlled in MPFI engine?
- h) What is the need of a pre combustion chamber D.I. system?
- i) Briefly explain Bharat Emission stage-VI emission norms.
- j) What is brake specific fuel consumption?

## SECTION-B

2. Why 2- Stroke Engines have been phased out? Discuss all aspects.
3. Compare the phenomenon and factors impacting Knocking in S.I. and C.I. engines.
4. Explain with sketches the working of a 3-way catalytic converter.
5. Show with the help of P-V diagram for an Otto cycle that the effect of dissociation is similar to that of variation of specific heats.
6. What do you mean by a supercharger? Discuss its effect on (a) power output (b) thermal efficiency (c) fuel consumption.

## SECTION-C

7. Describe with suitable sketches the following circuits of a modern carburetor: (a) Main metering circuit (b) Idling circuit (c) Starting circuit (d) Acceleration circuit.
8. Explain with neat sketches working of Diesel Direct injection system, Also, illustrate working of Distributor type diesel fuel injection pump.
9. The following data is given for a single cylinder oil engine.

Cylinder diameter = 18cm, Stroke = 36cm, Speed = 286 r.p.m., Brake torque = 375Nm, Indicated mean effective pressure = 7bar, Fuel consumption = 3.88 l/hr, Specific gravity of fuel = 0.8, L.C.V. of fuel = 44500kJ/kg, A : F ratio = 25:1, Ambient air temperature = 21°C,

$C_p$  (gases) = 1.2kJ/kg°C, Exhaust gas temperature = 415°C, Cooling water circulated = 4.2 kg/min, Rise in temperature of cooling water = 28.5°C. Find mechanical and indicated thermal efficiency and draw heat balance sheet on percentage.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**